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IRVING F. MORROW
EDITOR

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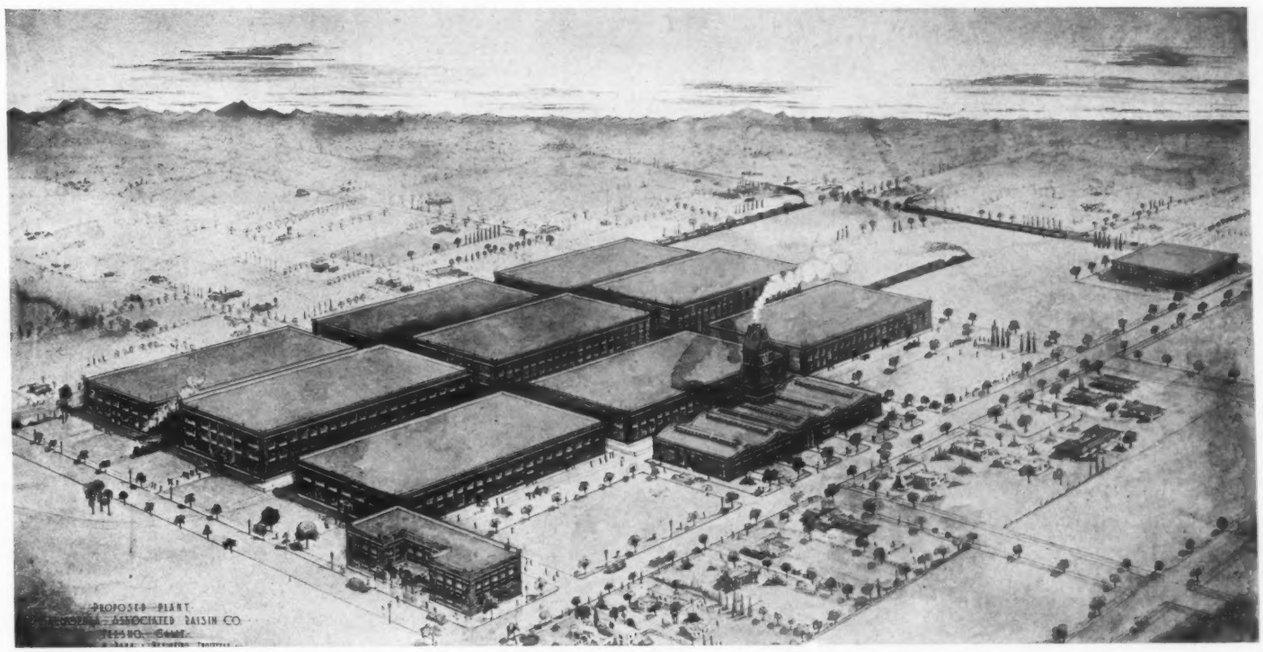
¶ The editor will be pleased to consider contributions of interest to the profession. When payment for same is desired, this fact should be stated.

MODERN FRENCH COMMERCIAL ARCHITECTURE
BUILDING OF THE "PETIT JOURNAL" PARIS

THE ARCHITECT
VOL. XVI SAN FRANCISCO, SEPTEMBER, 1918 NO. 3

Comments on Industrial Engineering

By FELIX KAHN



PROPOSED PLANT CALIFORNIA ASSOCIATED RAISIN CO., FRESNO, CALIF.
MACDONALD & KAHN, Designing Engineers

IN the present era of keen industrial competition, with the resultant speeding up of factory output, the proper layout of equipment and housing is an essential requisite. Nevertheless, even after all requirements have been met in these essentials, if other factors contributing to the morale of the individual workers are ignored, the plant does not attain its maximum of efficiency. In this connection should be considered the attractiveness of the plant itself and of the grounds surrounding it, recreation facilities, the proper safeguarding of the health of employees, and the elimination, as far as possible, of risk to life and limb.

The progressive, successful manufacturer realizes that his cost of production and amount of output were adversely affected by the loose methods of the past, when four walls and a roof afforded shelter for an unstudied layout of equipment. He, therefore, in planning new works, acquaints himself with other successful plants and methods, and with his works manager maps out his general scheme and his process schedule. It is here that the usefulness of the industrial engineer comes into play. He consults with the works manager on the process schedule and with him develops his routine diagrams. The process schedule shows the desired equipment, and the routine diagram shows the progress of the raw material to its finished state. He establishes the type of building to be adopted (the housing of the plant under one roof or a series of unit buildings, and whether one story or multi-story), the method of construction (whether fire-resisting or fire-proof), and what materials of construction are best suited to the locality.

The question of type of building is one that is governed entirely by circumstances, relative to the article to be manufactured, cost of the property, etc. Heretofore the adoption of the single story building, with a large ground area in consequence, was almost universal, especially in those plants which handled materials requiring any great amount of lifting. With the recent developments of high speed elevators and conveyors, however, the difficulty of handling material has been practically eliminated, and the general trend today is towards the multi-story type. In many cases where the work is of a heavy character and property can be secured at low cost the single story type will be found to have advantages;

BUILDING FOR THE NATIONAL PAPER PRODUCTS CO., SAN FRANCISCO
(ZELLERBACH PAPER WAREHOUSE)
MACDONALD & KAHN, Industrial Engineers

provided, however, sufficient ground area is secured for future extension of the plant, where increase in production is deemed probable. All plants should be designed for future or ultimate capacity. Hence an elastic layout is necessary, capable of expansion at a minimum of expense and interruption to business.

Generally speaking no method of construction should be considered that is not fire-proof, though in some isolated cases a fire resisting mill construction, well sprinkled, will suffice. An owner can always be secured against loss of equipment and building, but in the event of such serious destruction to his plant as would occur in non-fire proof construction, involving a cessation of operation, he faces an uncovered loss.

While the fundamental requisite of a factory building must be utility, aligned with it now stands attractiveness, or beauty. Beauty does not mean a lavish display of over decoration in form or color. A proper regard for proportion, mass, balance, good taste in color, disposition of members, and in the use of materials will result in attractiveness. Above all a factory building should appear to be what it is. This does not mean that it should have a cold, hard appearance and be devoid of all architectural treatment. The employment of a minor amount of decoration or enrichment is certainly permissible. A factory building of good architectural appearance redounds to the credit side of the ledger in a variety ot ways. As an advertising medium it is of decided value. A building pleasing to the eye will undoubtedly produce in the minds of the workmen a different attitude towards their work, one tending to greater enthusiasm and contentment, unconsciously creating efficiency.

As to the safeguarding of the employee against accident, the greatest agency in this direction is the introduction of good and sufficient lighting, both natural and artificial. Aside from this value, good lighting lessens loss of efficiency in the mechanical equipment of the plant. Moreover poorly lighted shops are certain to be far behind in cleanliness and sanitation. Dark corners invite the collection of dirt, which, not being directly visible, is allowed to remain, making the plant slovenly in appearance and unsanitary. The best diffusion of light can be

secured by placing the heads of windows as close to the ceiling as possible. With the cost of large size steel windows offsetting that of filling walls between piers, a maximum of light can be secured at no additional expense. In buildings containing stories of good height, a lighting area in exterior walls of 60 per cent. of surface can be attained. As the best of lighting will be impaired if the windows are allowed to accumulate dirt, care should be taken that all windows are readily accessible to the window cleaner. The character of work done in the factory will establish the system of artificial lighting to be adopted, but usually it is desirable to have a scheme of general lighting with local lighting where necessary.

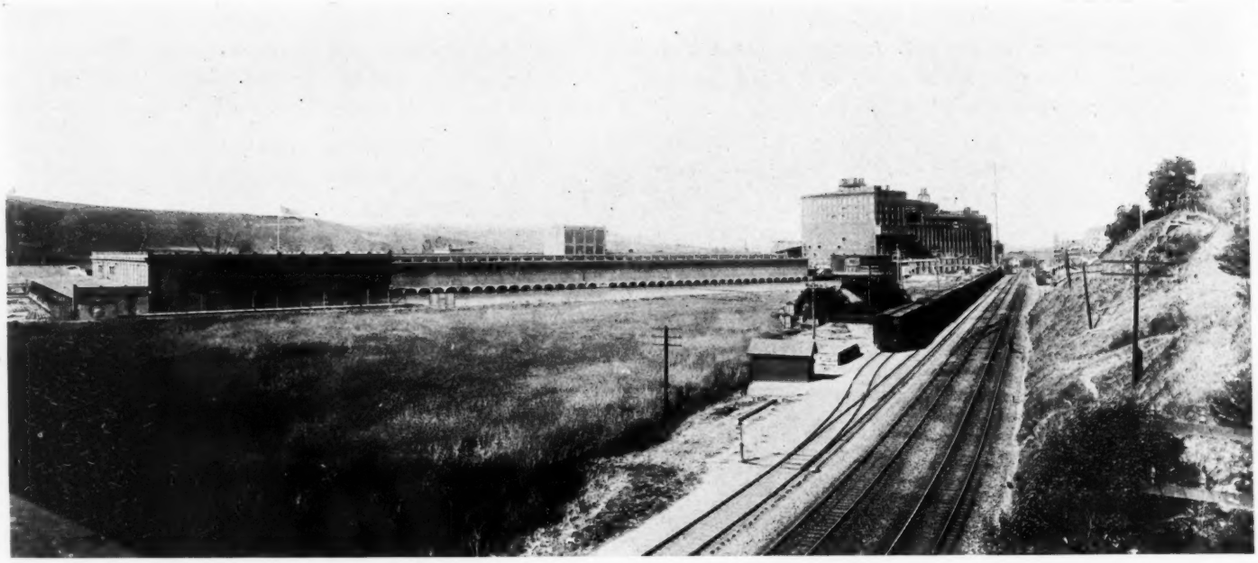
The adoption of an effectual scheme for heating and ventilating will be influenced by the type of building and the character of work done in the factory. Relying upon ventilation by opening portions of the enclosing sash alone is insufficient in most cases. We have a choice in the matter of heating of three systems, plenum, steam and hot water. Outside of the unsightliness of the many ducts in the plenum system, it is probably the most satisfactory, as it not only gives control of the heating, but in hot weather cool, fresh air can be forced throughout the building.

The value of welfare work in the factory has long been demonstrated, but its fullest importance has been brought out during the present world conflict. The welfare of the worker is of utmost importance in production, and the employer who grasps this works to the benefit of his employee and to his own profit as well.

Of special interest to the industrial engineer are those phases of welfare work that deal with working conditions, food and dirt, recreation and health. All these have direct bearing on the amount of production in the factory, and must be considered in the development of the plant. The proper regard for lighting, ventilation, heating, plumbing and drainage will result in working conditions necessary for efficiency and profitable production.

The employer is rapidly realizing that the health of employees is of paramount importance in the operation of his plant, and that a state of well-being after meals is reflected in production and accident records. Hence the recognized importance of the company restaurant. Due to its omission from most factories, a sanitary restaurant with well selected and cooked foods is not always available. The men must depend upon the small and usually unclean neighborhood eating places or saloons. They rush from their work and hurriedly swallow poor food and in some cases worse drinks. Large numbers of accidents are directly traceable to this habit. With the establishment of the company restaurant this is avoided and the men partake of a wholesome meal at a minimum

BAG SEWING DEPARTMENT
CALIFORNIA AND HAWAIIAN SUGAR REFINING CO., CROCKETT, CAL.
A. A. BROWN, Construction Engineer



CALIFORNIA AND HAWAIIAN SUGAR REFINING CO., CROCKETT, CAL.
A. A. BROWN, Construction Engineer

cost. The industrial army, as well as our army in France, "marches on its stomach." With proper food at noontime, there disappears the appreciable slacking up of production after the noon hour, which is so often noticed. These restaurants, under proper management, are self-sustaining and produce results to the employer in working conditions that are all profit. The future will see a wider extension of this form of welfare work.

A rest room in factories, especially where women are employed, should be provided in case of sudden indisposition of employees. It should be well lighted and be of cheerful aspect. In this connection also, it is the tendency of today to establish clinics, both surgical and dental, for emergency work. A physician and nurse in charge at all times will prove a profitable venture.

Provision for recreational facilities will be governed to a large extent by local conditions. Where spacious grounds are lacking, roof gardens can be provided. Fields for baseball, etc., are desirable where space permits.

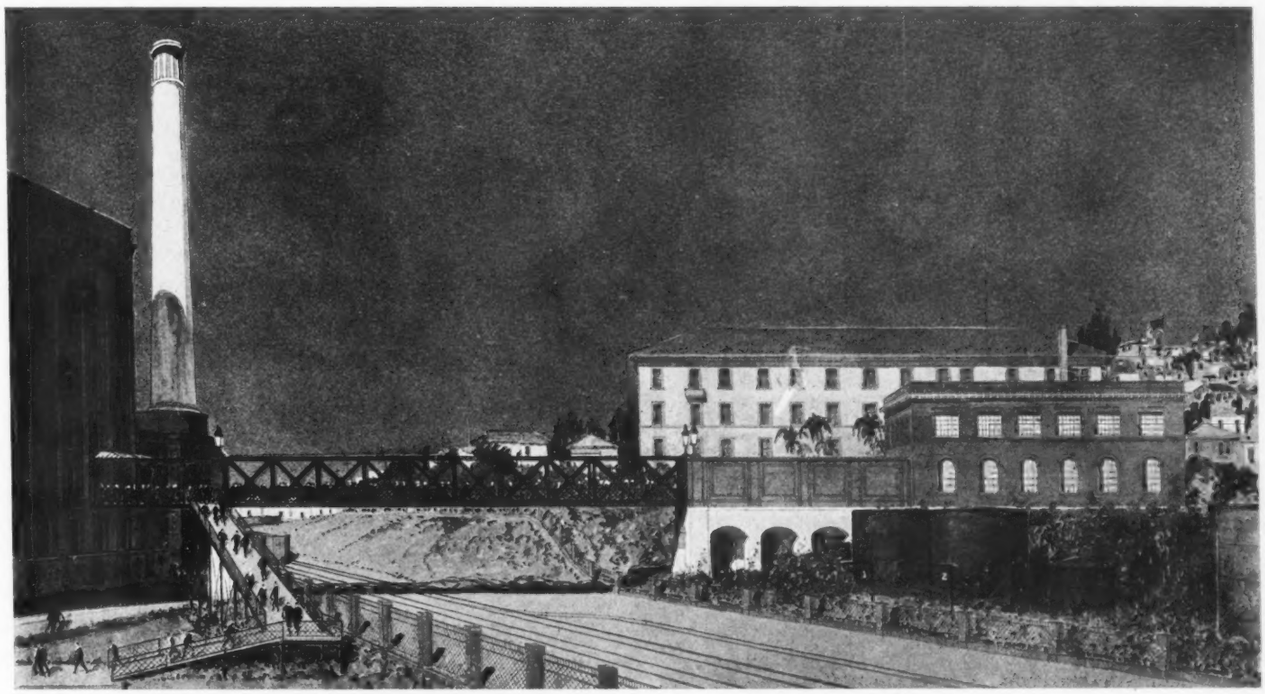
Illustrating the foregoing requirements for a factory building may be taken the Zellerbach factory and warehouse, at Montgomery and Francisco Streets, San Francisco. The present structure occupies half the site of 41,000 square feet, making it possible to double the capacity in the future. Here we have the single building, multi-story type, of seven floors. Reinforced concrete construction was adopted throughout, including floors. Fire-proof construction was essential for the storing of paper products, and heavy floor loads, cost considered, determined the construction. The building is sprinkled throughout. Architecturally it is handled very simply, with an entire absence of color. Through a good spacing of windows and a breaking up of street facades by flat corner bays, enough variety is given the building to produce a pleasing appearance. The rest rooms and restaurant established on the roof have proved so popular that recent extensions have become necessary.

The plant of the California Associated Raisin Company at Fresno is a good example of the several-building, multi-story type. The ground area of 20 acres allows ample room for the various units, spur tracks and recreational facilities. At present there are under construction the seeding building, occupying an area of 160 by 300 feet, and the power house. The entire plant will consist of about ten buildings, comprising seeding building, power house, garage, office building, concentration building, stemming building, etc. In the main the layout consists of a grouping of the various buildings about two central spur tracks, with the office building and the power house to one side. For transportation facilities the site is particularly well chosen, being at the junction of two lines of railroads. The seeding building is being built of reinforced concrete, flat slab type, 3 way system. While really three floors only, unusually high ceilings were necessary, allowing for the use of various mezzanine floors. The first story is 24 feet high. This height was required to accommodate the conveyors, etc., carrying the packed raisins to the cars for shipment. The process of manufacture, from the receiving of raw materials to the distribution of the finished article, is from the top floor downward by gravity. The raisins are received from the cars and trucks and elevated to the third floor, where they are distributed from the elevator heads by belt conveyors to the processors and seeders. After being seeded they are dropped through chutes to the packing tables on the second floor. The packed boxes and cartons are

carried by belt to spiral roller conveyors and distributed to the first floor mezzanine. After boxes are lidded they are carried to cars by gravity conveyor.

Owing to the high stories in the seeding building an unusual amount of natural lighting is available. More than 60 per cent. of the wall surface is window. The metal sash are unusually large, having an area of over 275 square feet each. Here the windows are carried from practically the ceiling line to within 15 inches of the floor. Everything possible has been done to make working conditions satisfactory in this plant, by the establishment of ample shower rooms, rest rooms, lunch room, locker rooms and surgical and dental clinics. While in architectural treatment simplicity prevails, a small amount of decoration and variety in color has been employed. The corners are marked by pavilions and the main surfaces of cement are relieved at the spandrels by simple brick patterns. The cornice is finished in brick, carrying a line of color around the entire building. This line of color is balanced by a brick course at the main belt course line.

The Box Board Paper Mill for the National Paper Products Co., at Stockton, Cal., now being completed, is an example of the one story manufacturing plant covering a large area. The new plant probably presents the highest development of any paper mill in existence. Unlike most mills manufacturing containers, etc., with their detached buildings for the different processes, here the routine is continuously carried on under one roof. This necessitates a large ground area, the building above covering over three acres. While virtually a two story building, the manufacturing is done on the first floor; the ground floor is used for storage purposes principally. The enclosing walls are of brick and the interior construction is both wood and reinforced concrete, depending on the nature of the work done in the various departments. The complete development of the plant will include recreational and housing provisions for the employees. Architecturally little has been done, entire dependence being placed upon mass, line and window spacing for the pleasing effect produced. One outstanding feature of this paper mill is its exceptional natural lighting, a point habitually slighted in mills of this character.

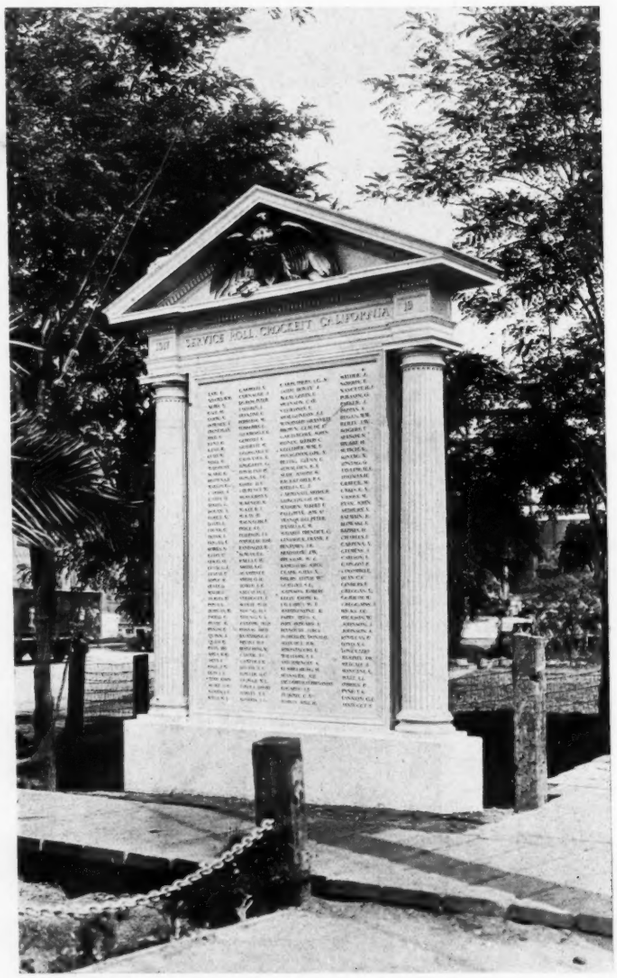


NEW OFFICE AND STEEL BRIDGE ACROSS THE TRACKS WITH RAMP

Industrial Efficiency

By CHARLES T. PHILLIPS, C. E.

EMERSON is credited with having said that "Everything has a price—and if that price is not paid, not that thing but something else is obtained." A thorough realization of this maxim may have saved numerous manufacturers from commercial failure. The endeavor to obtain or to give something for nothing is not a sound business principle, and no great business was ever built under a management so short-sighted as to attempt the practice of such deception on itself or on the public. The ultimate result is sure to be financial quicksand for the manufacturer and a loss of confidence on the part of the consumer. The writer has practiced engineering for many years in the industrial field, and he has never seen anything other than failure result from an attempt to avoid legitimate cost. Concrete cases are usually more pointed than generalities, and a few will be cited.



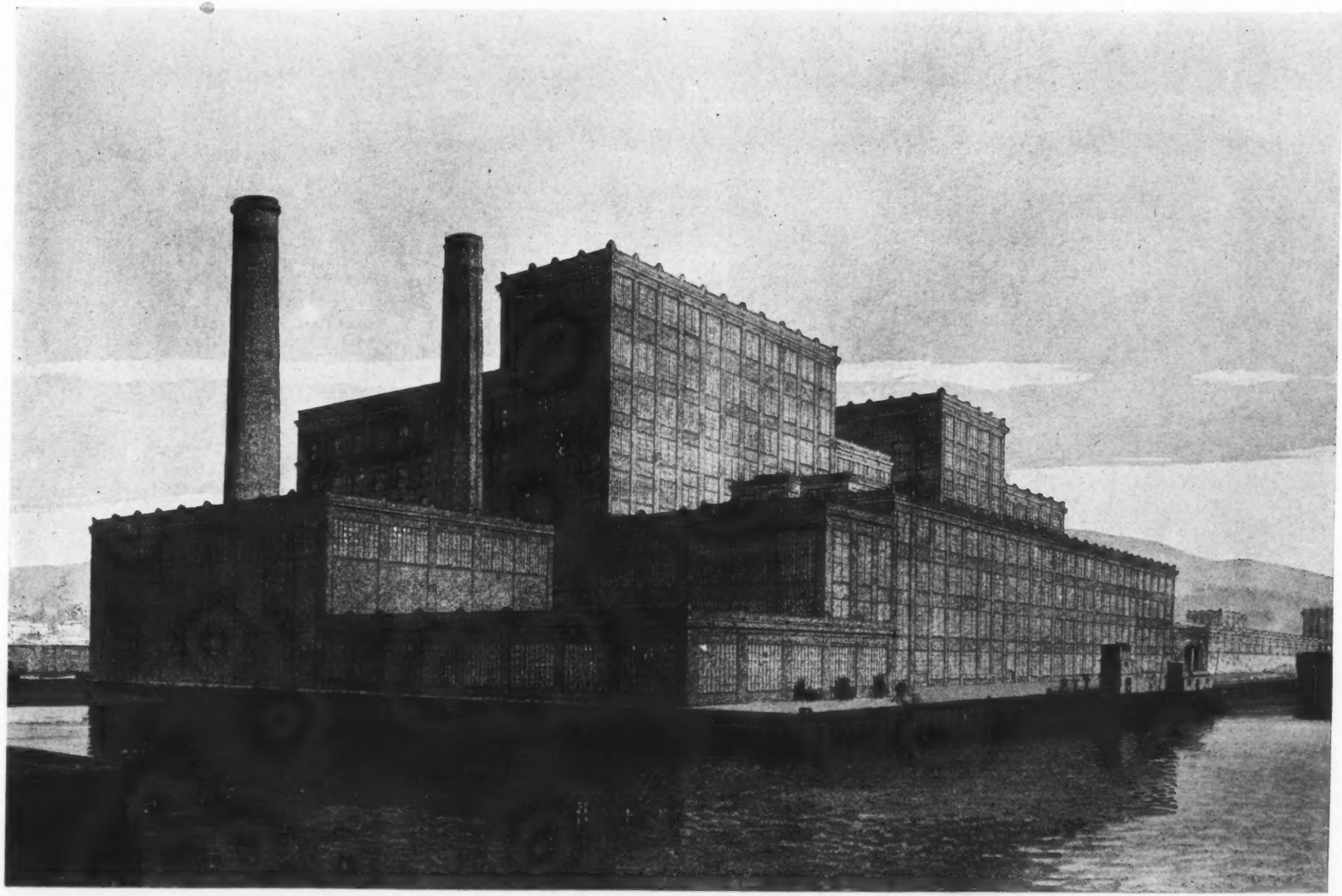
SERVICE ROLL OF THE CALIFORNIA AND HAWAIIAN SUGAR REFINING CO. CROCKETT, CAL.

A manufacturer who, through diligence, had built up a good business, but, due to the limited size of his plant, was unable to supply the demand, obtained sufficient capital to operate on a much larger scale. The old plant was abandoned and plans were prepared to build a larger one. This manufacturer, while successful in the handling of the smaller business, where every detail was under his supervision, labored under the delusion that he could manage a business six or eight times larger by the same methods. His associates advised him to obtain the services of an engineer to assist in planning the new plant, and the writer was employed. It was decided to use an individual electric drive, buying electrical energy from the power corporation. A cost statement was prepared and the item of electric motors was nearly $7000, which was the minimum price at which these motors could be obtained. Without consulting his engineer, the manager, who had in the meantime gone East to select certain machinery, wrote that he had bought his motors and had saved several hundred dollars. Omitting details, the ultimate result was that, in the hope of saving several hundred dollars, he had bought motors entirely unsuited for the work, and the expenditure necessary to adapt these motors to the conditions existing in his factory was nearly $4000. The over-all efficiency was reduced from 82 per cent. to 61 per cent., which amounted to an increase of over 34 per cent. in his monthly cost for electrical energy. This man spent several thousand dollars trying to save several hundred, which goes to prove that Emerson was right. The salesman who sold the motors made a good commission, to be sure, and although the motor manufacturer was a large concern, there was no redress from that source.

A set of plans was prepared for a complicated system of high-pressure steam piping, and bids were obtained from reputable contractors for the furnishing and installation. The owners of the plant, however, in order to save a few dollars, disregarded the advice of the engineer and employed a superintendent who claimed to be experienced in that class of work, to buy the material, employ mechanics and install the work by day labor. Thinking he could make an additional saving by deviating from the engineer's plans, and without consulting with the engineer, this superintendent made several changes in the work. Eighteen days after the plant had been placed in service the piping gave way, scalding the fireman, damaging the building and ruining several thousand dollars' worth of unfinished products.

A certain institution, in order to obtain something for nothing, decided that it would save an engineer's fee of six per cent. by having the various contractors and manufacturers furnish plans and specifications free. Each bidder was to offer a specification covering his work. Although an engineer had made an estimate of $200,000, the bids submitted with specifications ran from $130,000 to $170,000. The $130,000 bid was accepted and the work installed, but in less than one year the complete installation had to be scrapped and sold for junk, and a new installation made at the engineer's original estimate.

The alert manufacturer is ever on the lookout for means that can be employed to cut down the cost of the



CALIFORNIA AND HAWAIIAN SUGAR REFINING CO., CROCKETT, CAL.

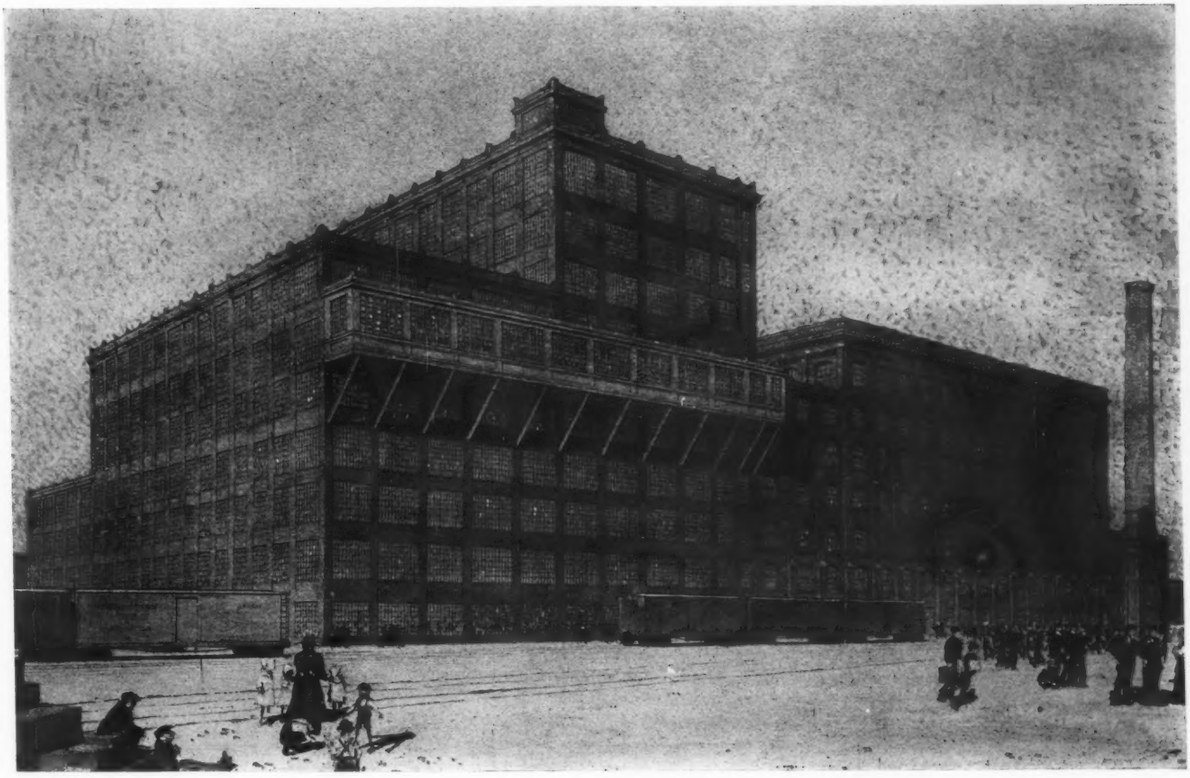
A. A. BROWN, Construction Engineer

INTERIOR VIEW

INTERIOR VIEW

BUILDING FOR THE NATIONAL CARBON CO., SAN FRANCISCO

MAURICE C. COUCHOT, Consulting Engineer



CALIFORNIA AND HAWAIIAN SUGAR REFINING CO., CROCKETT, CAL.

A. A. BROWN, Construction Engineer

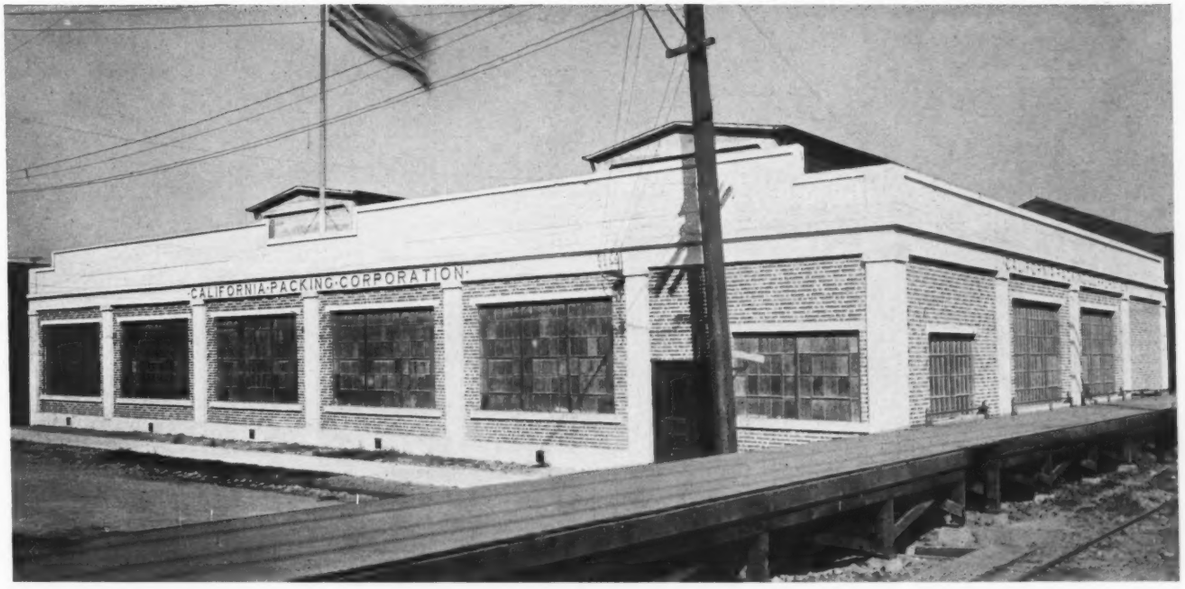
HOSPITAL WARD

INTERIOR VIEW

BUILDING FOR THE NATIONAL CARBON CO., SAN FRANCISCO

MAURICE C. COUCHOT, Consulting Engineer

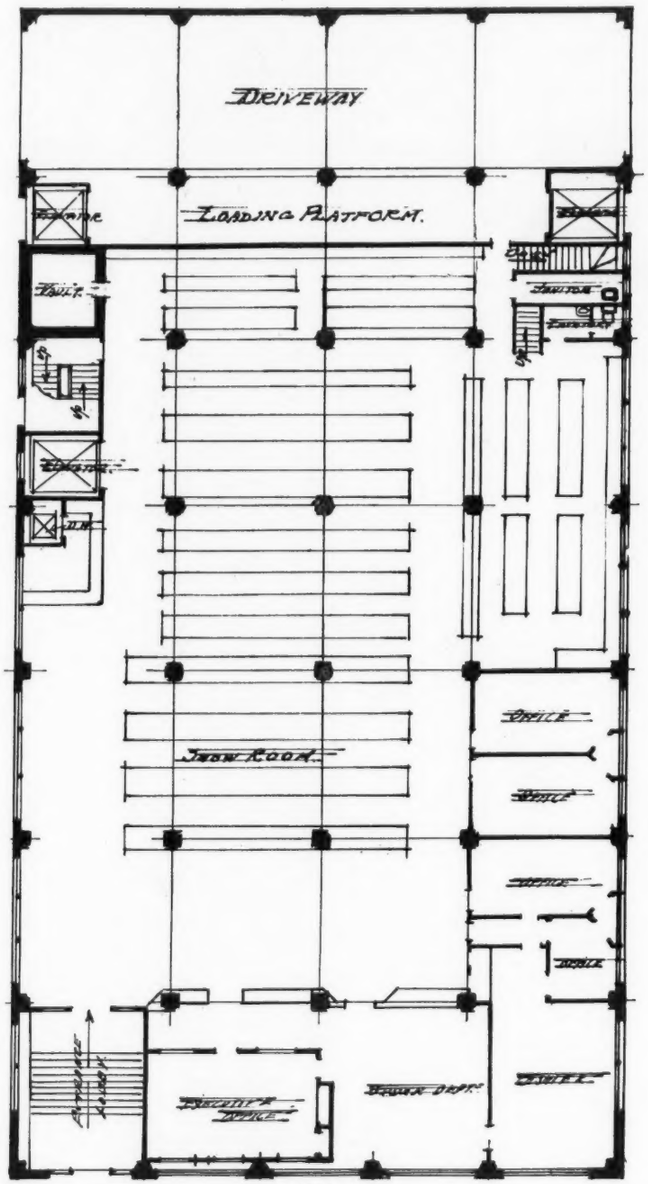
WAREHOUSE, SAN JOSE, CAL.



LABEL PRINTING DEPARTMENT, OAKLAND, CAL.

CALIFORNIA PACKING CORPORATION

PHILIP L. BUSH, Civil Engineer



FIRST FLOOR PLAN

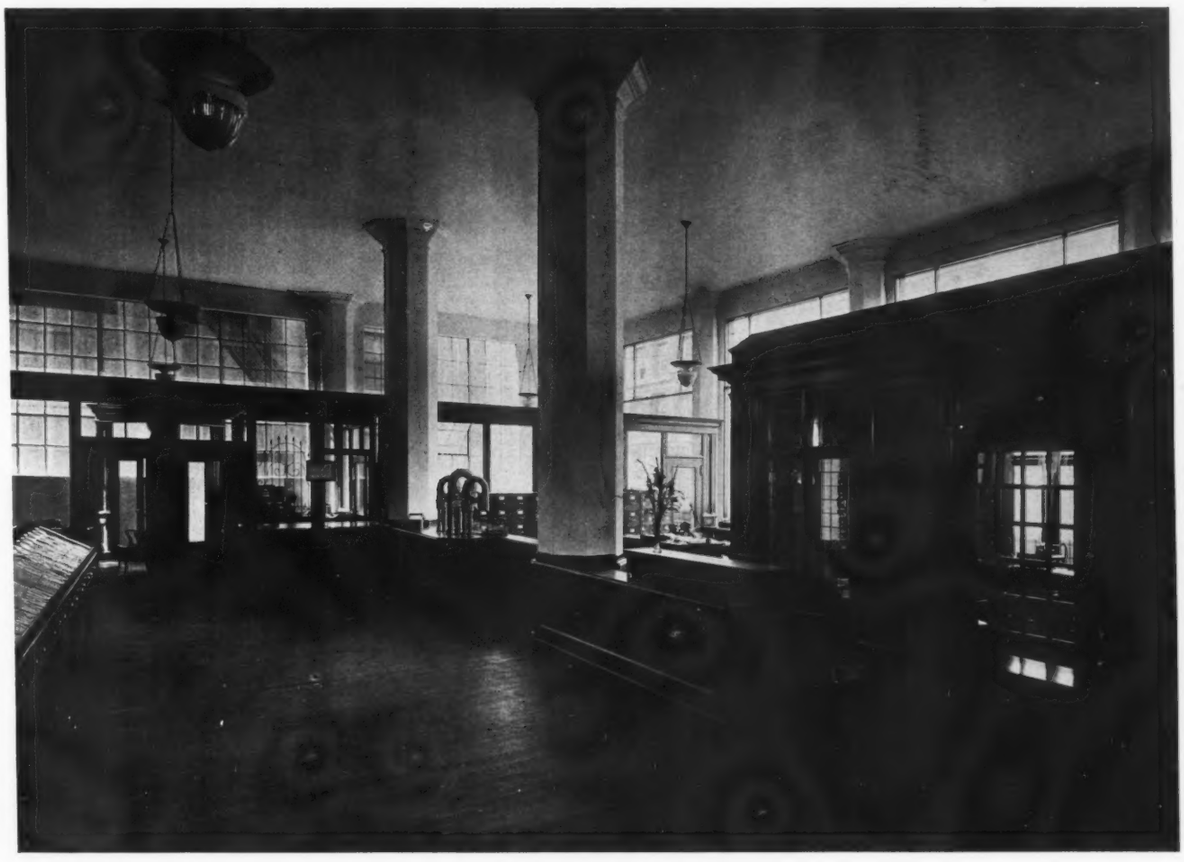
FRONT VIEW

NEUSTADTER BROS. BUILDING, SAN FRANCISCO
FOR F. M. RAY, ESQ.

H. P. HOYT & CO., Constructing Engineers

SYLVAIN SCHNAITTACHER, Consulting Architect for Neustadter Bros.

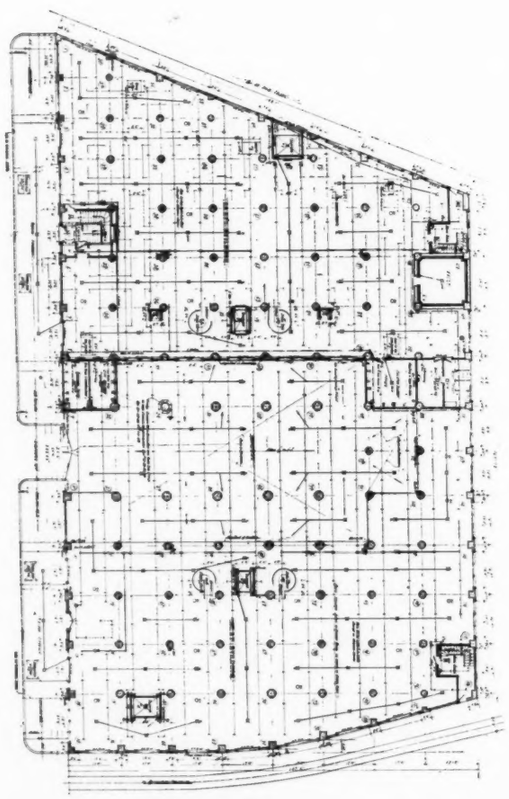
VIEW OF EXECUTIVE OFFICE



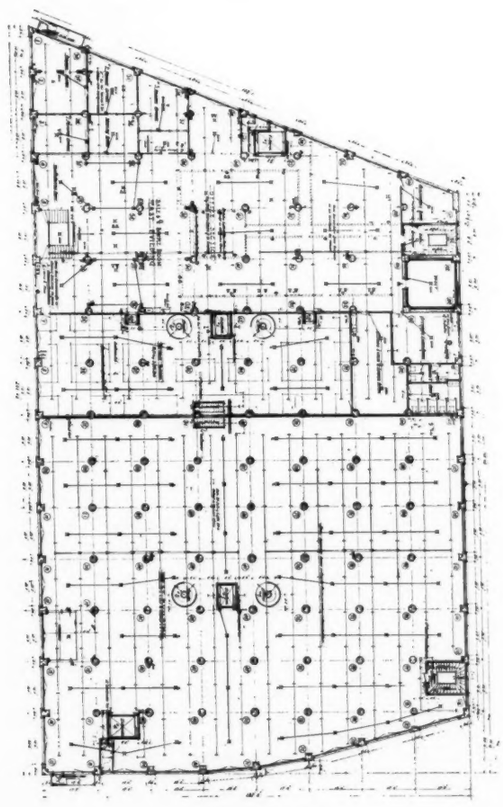
VIEW OF GENERAL OFFICES

NEUSTADTER BROS. BUILDING, SAN FRANCISCO
SYLVAIN SCHNAITTACHER, Architect

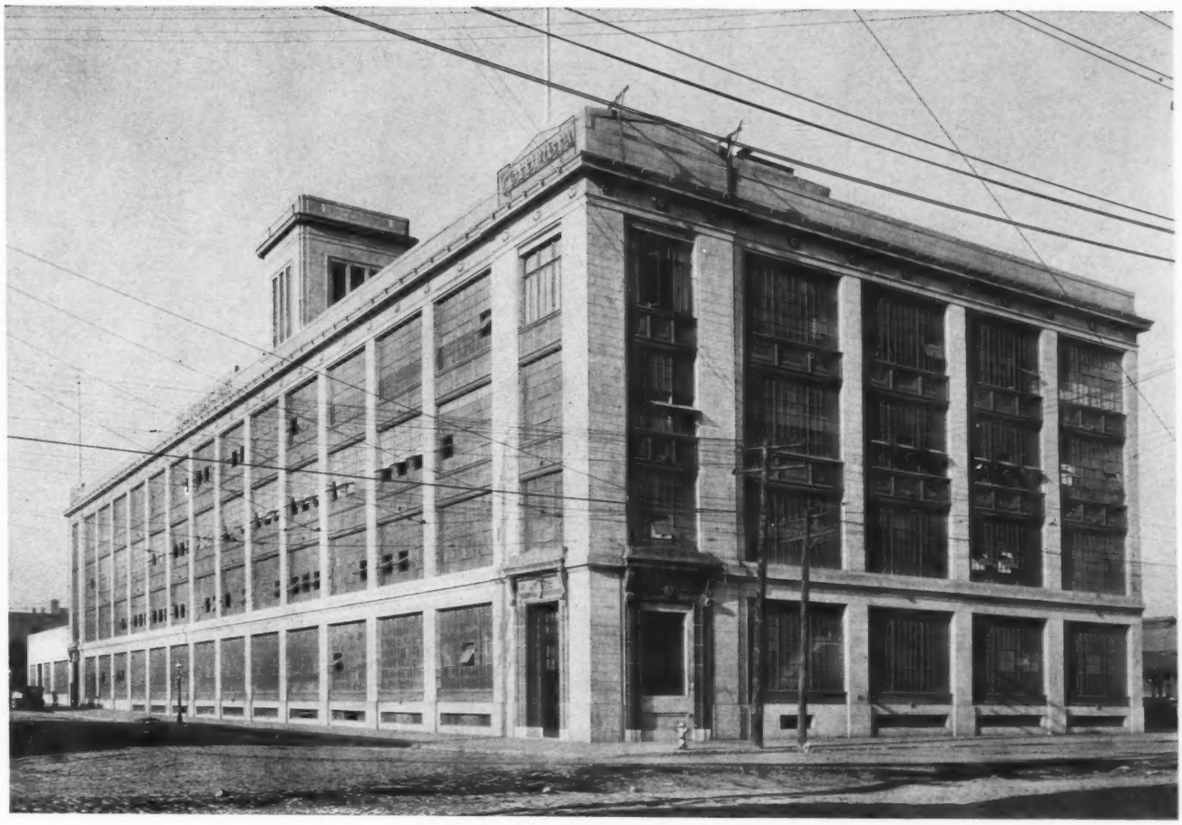
COMMERCIAL BUILDING FOR J. D. & A. B. SPRECKELS SECURITIES CO., SAN FRANCISCO
G. A. APPLEGARTH, Architect



FIRST FLOOR

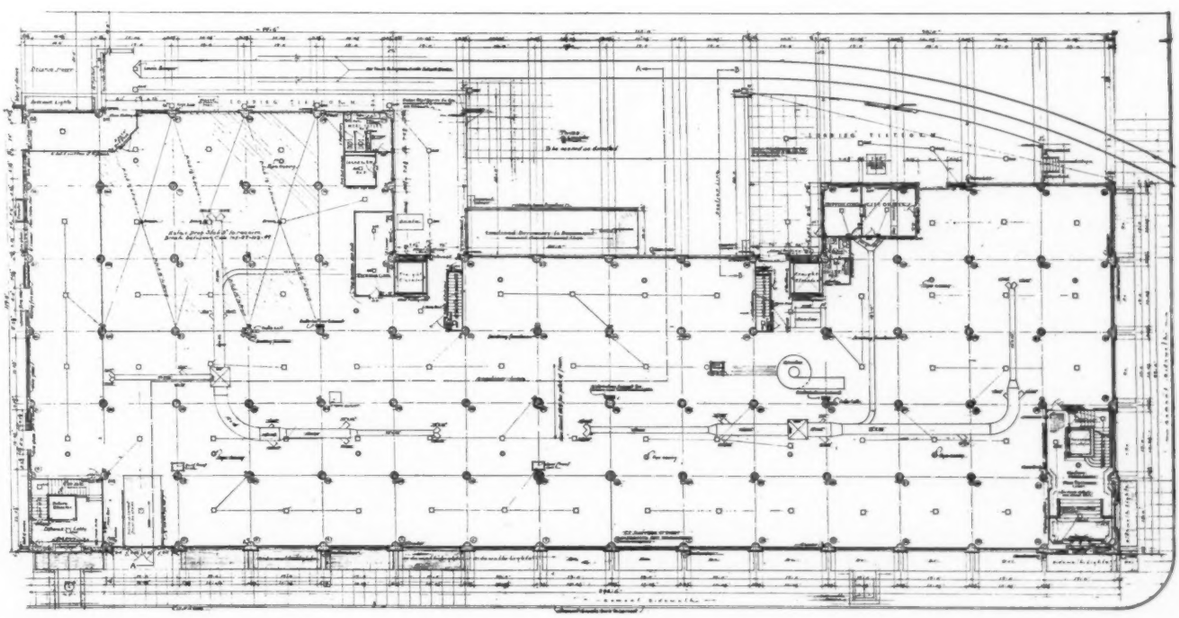


SECOND FLOOR



NATIONAL CARBON COMPANY BUILDING, SAN FRANCISCO

MAURICE C. COUCHOT, Consulting Engineer



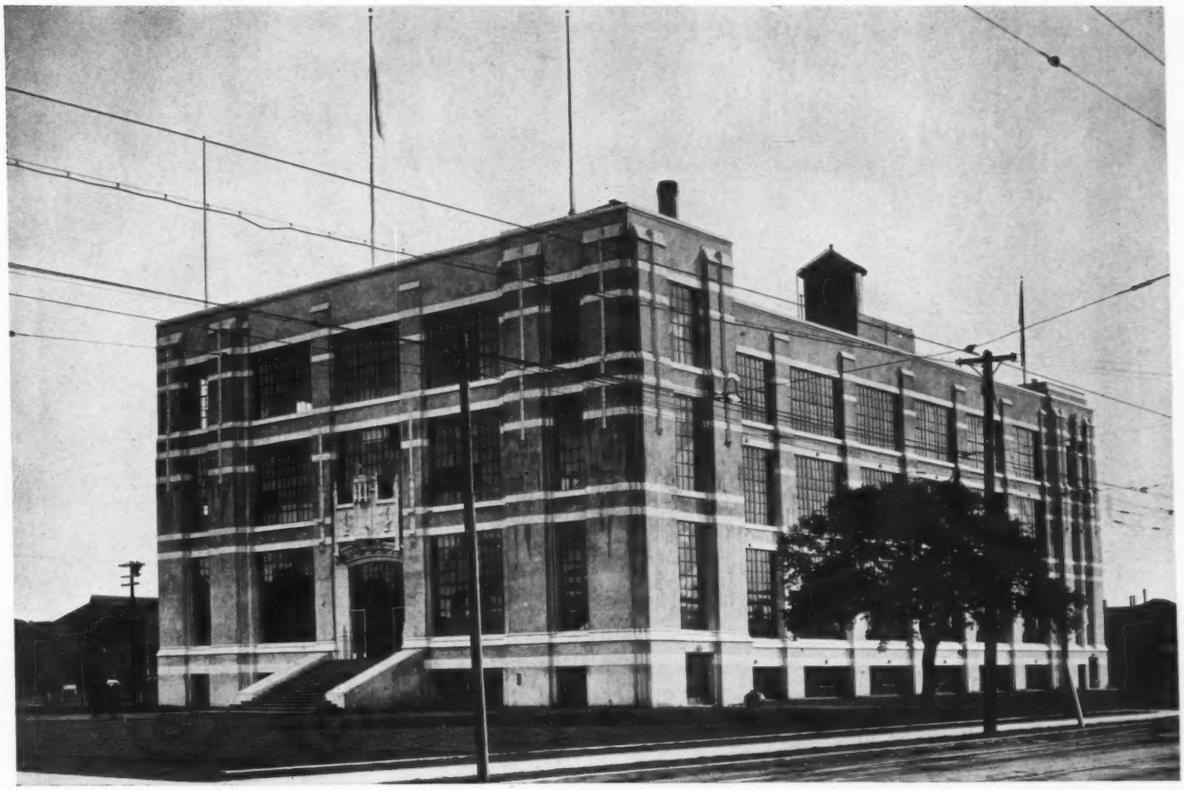
FIRST FLOOR PLAN

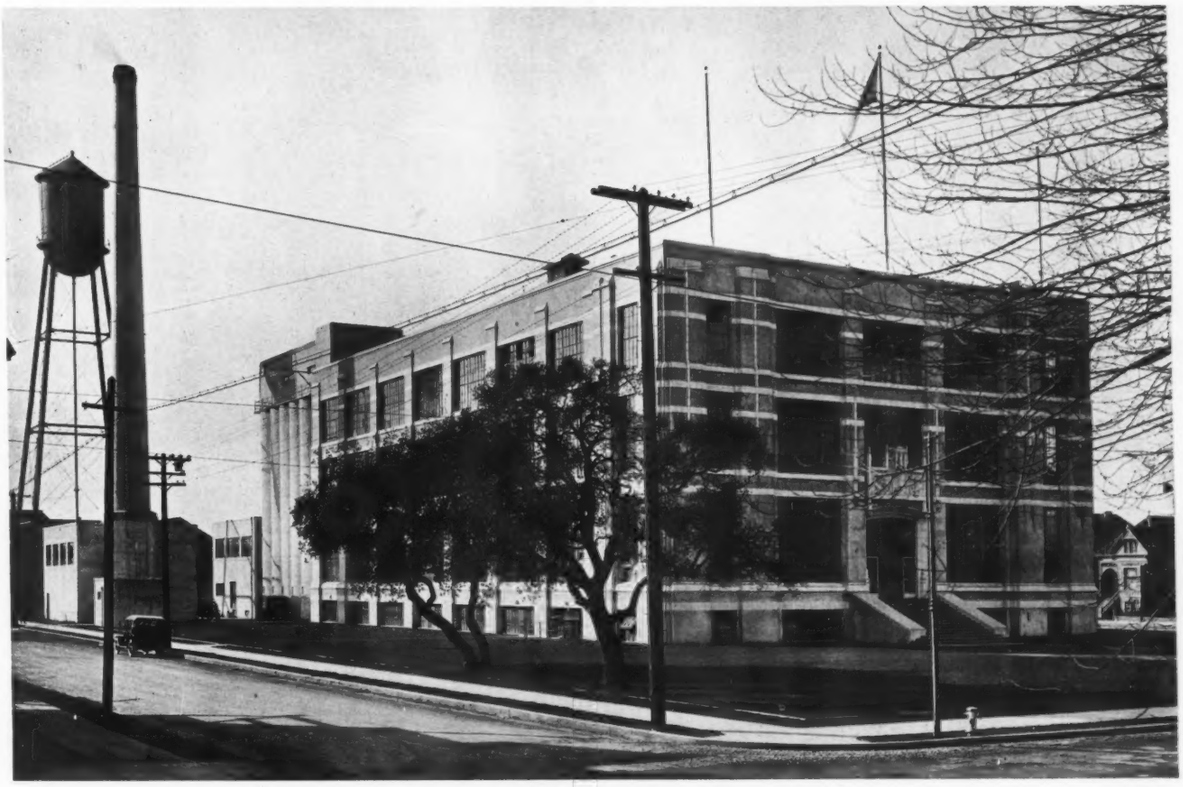
RECEPTION FOYER

GIRLS' DINING ROOM

BUILDING FOR THE PACIFIC COAST SHREDDED WHEAT CO., OAKLAND, CAL.

LEWIS P. HOBART, Architect. CHAS. H. CHENEY, Associate



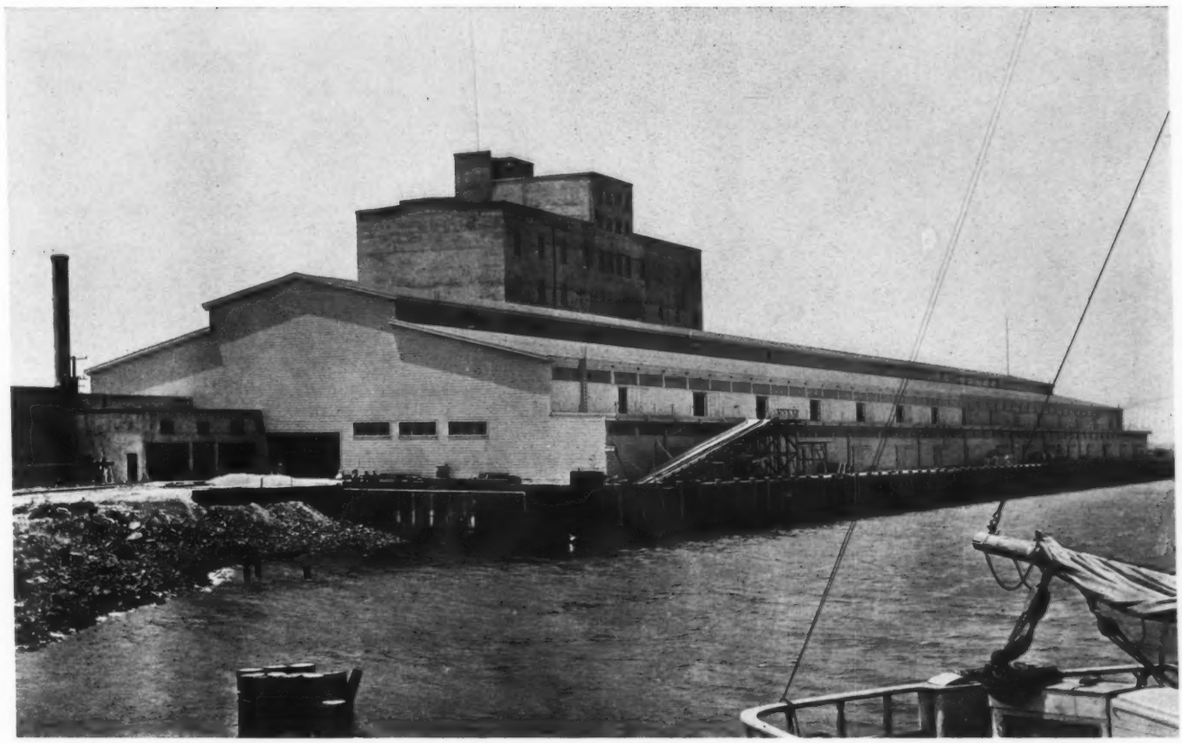


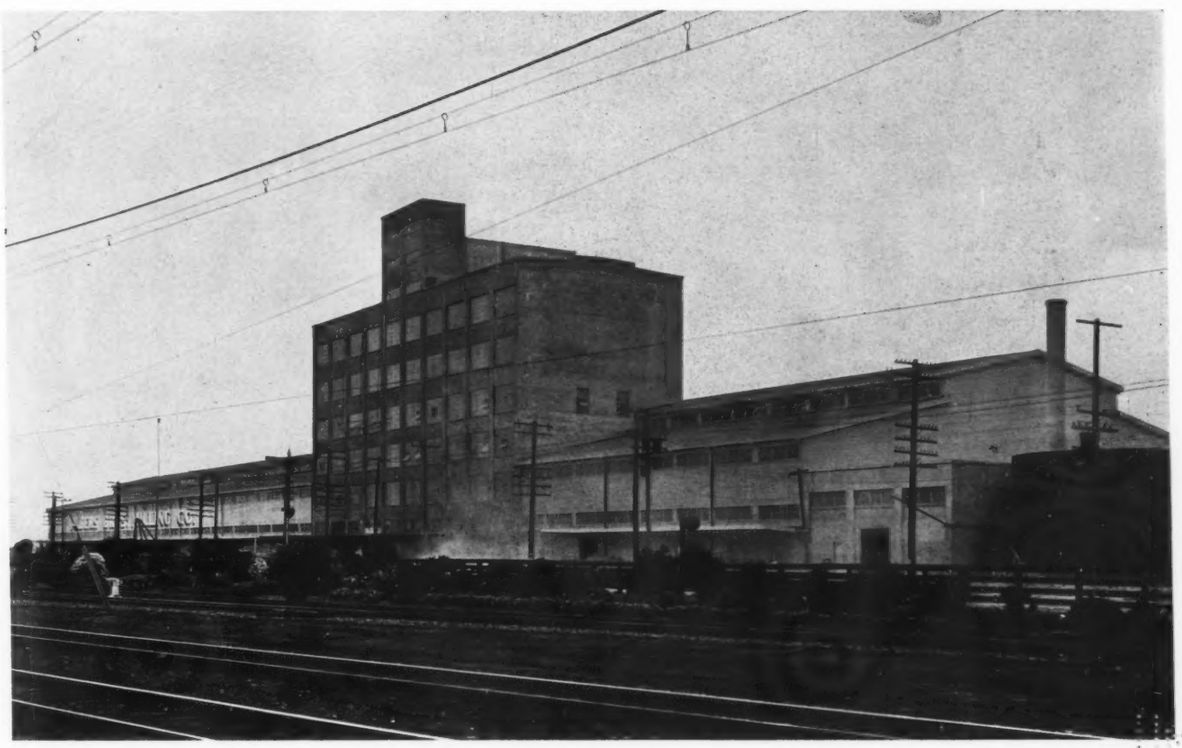
BUILDING FOR THE PACIFIC COAST SHREDDED WHEAT CO., OAKLAND, CAL.

LEWIS P HOBART, Architect. CHARLES H. CHENEY, Associate

BATTERY BUILDING FOR JOHN A. HOOPER, SAN FRANCISCO

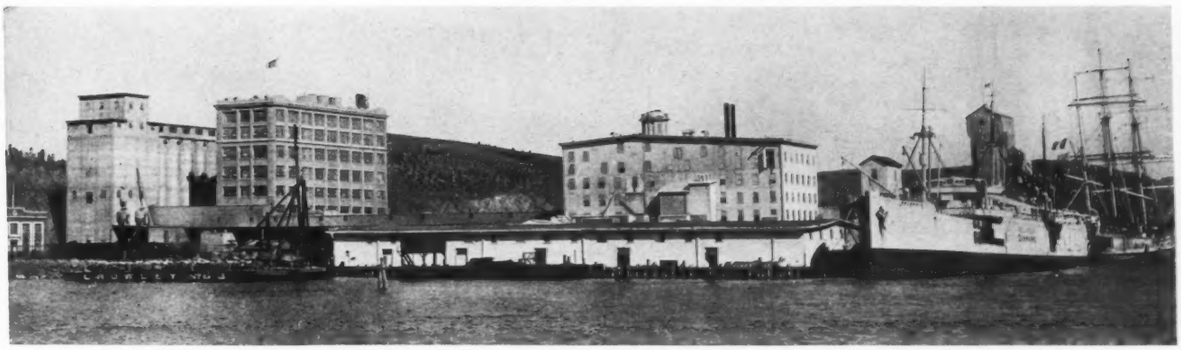
KENNETH MAC DONALD, JR., Architect and Manager of Construction

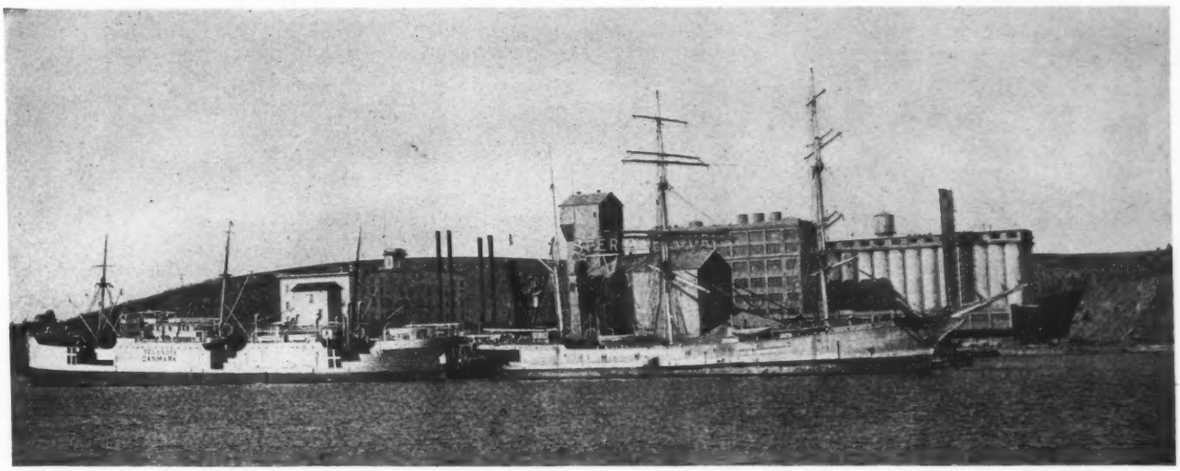


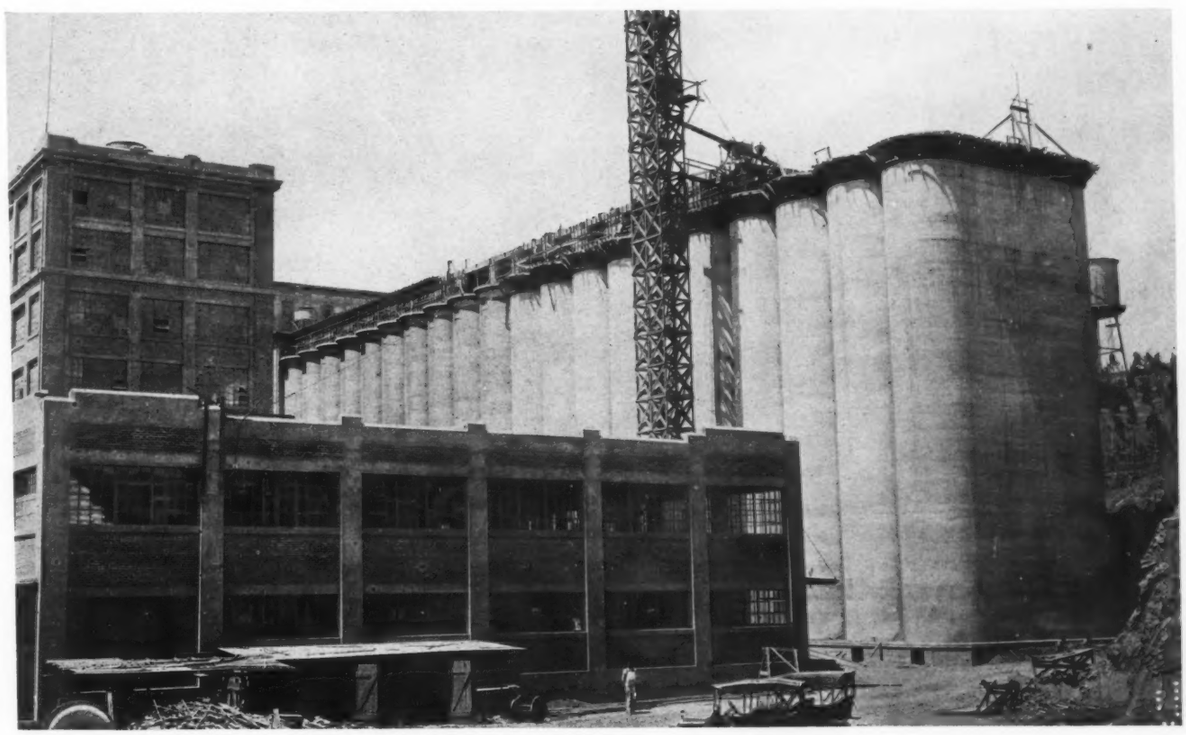


ALBERS BROS. MILLING COMPANY OAKLAND PLANT

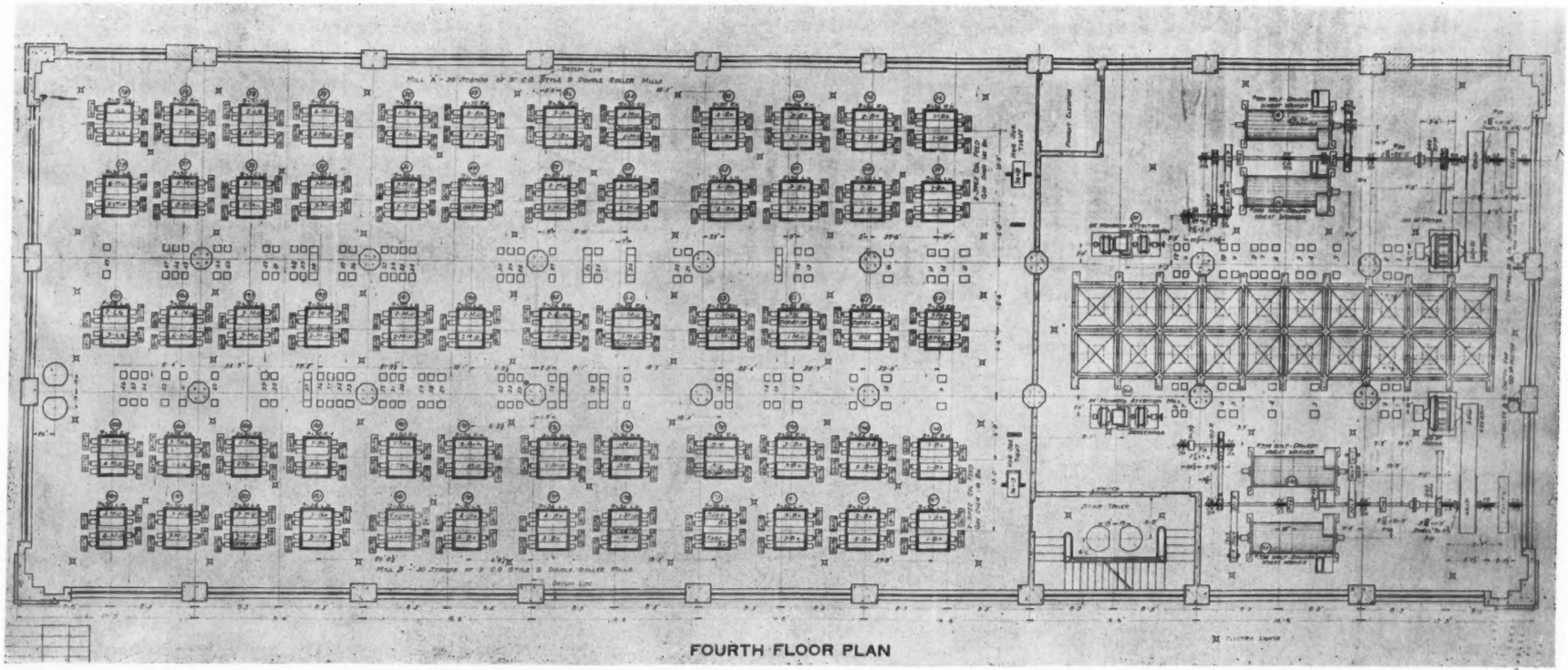
R. M. HENNINGSEN, Consulting Engineer







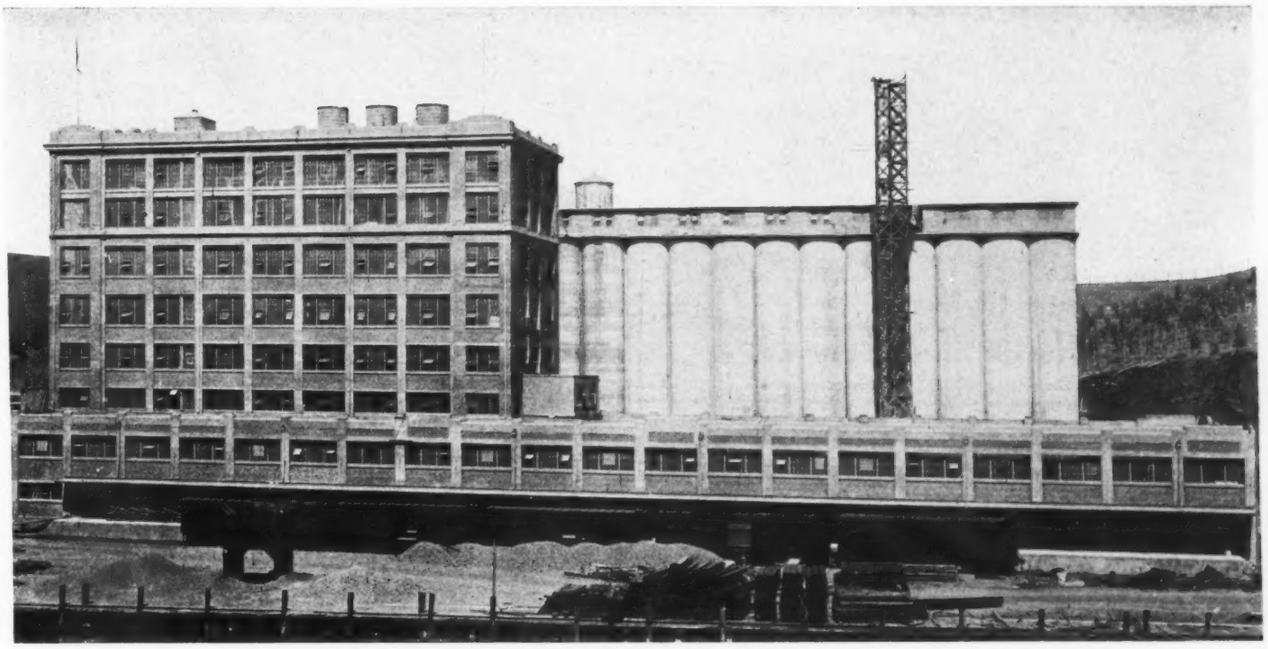
SPERRY FLOUR COMPANY, VALLEJO, CAL.
MAURICE C. COUCHOT, Consulting Engineer



FOURTH FLOOR PLAN

MILL FOR SPERRY FLOUR COMPANY, VALLEJO, CAL.

MAURICE C. COUCHOT, Consulting Engineer



MILL AND WAREHOUSE FOR THE SPERRY FLOUR CO., VALLEJO, CAL.
MAURICE C. COUCHOT, Consulting Engineer

finished product. This is a legitimate saving, and, as in military operations, a large element of success is that of surprise. This can be accomplished only by keeping the enemy or competitor in the dark and by underselling him, at the same time keeping the proper balance between the manufacturing cost and the selling price, or by giving a superior article at the same price. While the first cost still seems to be the ruling factor in making a sale, the manufacturer has to face the factors of quality and reliability, especially in the matter of staple articles. Once the suspicion of the public is aroused, it is almost impossible to create confidence again. No amount of advertising space, no increase in quality, no power of persuasion will suffice to restore the lost prestige.

In almost any line of manufacturing it is a comparatively simple matter to invent labor-saving machinery, but it is a very complex matter to get the whole mass of machines and operations finally working together to the greatest service of all people engaged. Correlation is difficult to work out; all manufacturing plants are alike; each is a correlation of parts; yet there is a wide difference in the final results.

In the same town there may be numerous examples of firms engaged in the same kind of manufacture, using the same kind of machines, made by the same firms, using the same kind of raw materials, making the same kind of output, competing in the same labor market and selling in the same territory, yet one is making very large profits and the others perhaps little or none. This difference is often due to the amount of skill and foresight used in the correlation of the various parts of the enterprise. Again, labor-saving machinery may not be as economical as hand labor, when ultimate cost is considered. Many factory superintendents have found this out after advising the investment of thousands of dollars in expensive machines. A detailed analysis is not always made of the conditions surrounding certain operations; the superintendent is often carried away by the glowing picture presented by the salesman, or by the alleged saving made by competitors, or he may fail to consider that perhaps his conditions are radically different. There is a balance between hand labor and machine labor. The depreciation of the machine, the quality of the work done, and the reliability of both methods are sources of interesting study. Motion study of the worker has received considerable attention during the past ten years. Mr. Frank Gilbert was perhaps the first person to consider seriously the inefficiency of the average worker, and he has demonstrated that scientific dexterity can be attained by workers in all trades by applying the same principles that are used in training a stenographer or a linotype operator, each of whom is required to study certain motions and exercises in order to acquire the best rate of speed.

The efficiency of the various items that go to make up the operating cost can be analyzed. The items should first be taken individually and then in groups, and finally as a whole, so as to obtain a harmonious combination that will eliminate all waste and conserve mechanical and man power and reduce the wear on the equipment. The handling of raw material from the source of supply until it finally emerges as the finished product is a source of fruitful study, and the majority of industrial plants are built around the path of least resistance taken by the manufactured article in its progress. In some instances this path will require that all operations take place on one plane, while in other cases the raw material is elevated to higher planes and the various necessary operations are performed on lower planes, the product being delivered by gravity from one plane to the other and finally reaching the lowest plane for packing and shipping.

An industrial plant requiring a large amount of moving machinery driven by a steam engine, electric motor, or other source of power, faces at all times the necessity of keeping this item of operating expense at a minimum. The mere saving of fuel or electrical energy does not necessarily mean a saving in the ultimate cost. Many industrial plants have put in expensive condensers for the

NIGHT VIEW—PLANT OF THE PACIFIC COAST SHREDDED WHEAT CO., OAKLAND, CAL.
LEWIS P. HOBART, Architect. CHARLES H. CHENEY, Associate

steam plant when fuel cost was so low that the investment was not justified. Other plants have endeavored to save by the installation of individual electric drive, expensive ball or roller bearing shafting, when an analysis of the overall operating cost would have shown that although a saving was made in the energy consumption, the increased cost of maintenance, with interest and depreciation, was a decided loss. Again, an attempt is frequently made to save in the initial cost of a machine when the ultimate cost is not considered. A certain concern bought a so-called bargain in a steam engine. The president had used his own judgment, and for $18,000 he had obtained this engine, the original price of which had been $22,000. Similar engines of higher efficiencies and of the same power sold for approximately $24,000, and the firm congratulated itself on its wonderful keenness in obtaining for $18,000 a machine that should cost $24,000. Later a test and report was made by an engineer and it was shown that this bargain was eating up $10,000 a year in fuel above that which the $24,000 engine would have required for the same power output. It might be mentioned that this inefficient engine was of first-class manufacture, but was made to fulfill certain requirements that did not exist in this particular plant. A report by a competent engineer would have saved this firm several thousand dollars a year.

A system recording all operations, with the details of expense connected with same, is the only reliable method of determining where waste can be eliminated and leaks located. This is a part of every business organization. The scientific farmer now records the number of eggs laid by each hen, the feed required by each hen, the quality and quantity of milk from each cow, and the amount of feed required to produce a pound of pork. By this means he can readily eliminate the slackers, and the factory manager can do likewise. The weak links in the chain can be strengthened, the inefficient worker can be eliminated and a spirit of rivalry can be instilled into each department.

The new Ford plant is an example of what can be done by these careful records. The layout of the new plant being based on past performances, the assembling plant is one of the wonders of the manufacturing world. Here all parts of the automobile are brought together, yet there is no interference; there is no lost motion; there is no waiting; a uniform speed is observed, therefore the highest economy is maintained at all times.

It is well known that welfare work is a stimulant to efficiency, and manufacturers are coming to the realization that it is not philanthropy to keep a factory in such physical condition that the workman feels comfortable and happy in it. Friendly competitions of an athletic or other nature, bands, orchestras, annual picnics and outings and other forms of diversion now form a part of all modern factory management. Sanitation, heating, ventilating and lighting are receiving the consideration due them, and no manufacturer who expects to obtain maximum results can ignore the importance of having a clean, comfortable and well lighted premises. Proper sanitation prevents disease, proper ventilation prevents mental sluggishness and headaches and protects the lungs from dust and impurities, the proper temperature gives comfort to the worker, and a well lighted working space prevents eye strain and increases the speed of the operations. Each of the items of sanitation, heating, ventilating and lighting (natural and artificial) is an exact science and rule-of-thumb methods will not obtain satisfactory results.

The writer has met time and time again with the one great fault in connection with new industrial plants, and that is insufficient time for proper planning. Plans that should be given months of study are rushed through in weeks or days, and the owners then repent at their leisure what they planned in haste.

Architect Hart Wood has moved his office from 707 French Bank Building to 1304 Merchants National Bank Building.

NOTES ON PLATES

During the past year the California and Hawaiian Sugar Refining Co. at Crockett, California, has made large extensions to the sugar refinery, increasing the capacity from a production of 950 tons of sugar per day to 1500 tons, and now has under construction a six story char house and shops building, a four story store house and two story office building and bridge. The job, when completed, will represent an expenditure of approximately four and a half million dollars for buildings and equipment. All factory buildings are Class A construction, viz., structural steel supporting frame, concrete floors and brick walls. The office building, which is located across the tracks from the main factory group of buildings, is of Class C construction. There have been added 426,000 feet of floor area. The buildings are located over the water on Carquinez Straits. The foundations are of three general types, namely, concrete caissons, resting on bed rock; wooden piles, encased in concrete to the mud line as protection against toredos, and concrete piles.

On the completion of the new office building and entrance, the old grade crossing will be removed. Formerly all employees entering the premises had to cross the Southern Pacific tracks. With the new arrangement there will be but one entrance to the Sugar Refinery, through the office building and crossing a bridge over the tracks.

The work is being done by force account and contract. All foundation work was done by the company forces. Lindgren Company, General Contractor, C. C. Moore & Co., contractor for boiler house equipment, including concrete chimney 14 ft. in diameter by 220 ft. high. A. A. Brown, Engineer, is in charge of work under Geo. M. Rolph, General Manager.

The National Carbon Company's plant at the corner of Eighth and Brannan consists of a main building 300 feet long with an average depth of 110 feet, four full stories and basement, with a one story addition for garage and mill. The construction is of reinforced concrete throughout. The floors are designed for a working load of 250 pounds per square foot.

This building is at present one of the most modern factories in California. Every posible means of promoting the welfare of employees has been incorporated into it; it has four flights of stairs, four elevators, one gravity chute, full sprinkler system and full heating and ventilating system, and is absolutely fire-proof. The maximum area of windows to insure sunlight has been provided.

The roof of the building is used as a recreation room for the employees at lunch time. There is a dining room, hospital and ward room, and a trained nurse is in attendance. Conveniences for men and women are of the latest pattern, marble being used. Hot and cold water, showers and steel lockers have been installed.

In addition to this, every possible safety device has been installed around the machinery to prevent accidents.

The plant was designed by Maurice C. Couchot.

The new Sperry flour mill and grain storage at Vallejo is the last word in flour mill construction and installation. The new mill building is a reinforced concrete structure 150 feet long, 54 feet wide, 120 feet high, containing eight stories, six of which are entirely occupied by flour making machinery able to turn out nearly 4,000 barrels of flour per day of 24 hours. The building is entirely fire-proof and every means of providing for the safety and welfare of the employees has been installed. The very latest conveniences for men have been built.

The warehouse is a reinforced concrete structure 350 feet long, 100 feet wide, two stories high, designed for a load of 350 pounds per square foot. This warehouse has numerous conveyors to distribute products about the plant and save hard labor.

The buildings have been painted with Rice's "Mill White" and mill paint, and are kept up to the greatest degree of cleanliness possible. The grain elevator building is a reinforced concrete structure 350 feet long, 50 feet wide and 112 feet high, having a capacity of 1,000,000 bushels. The head house portion of same contains all the elevator machinery, cleaning machinery and dust collectors to prepare the grain before it goes into the mill. A 600 foot steel bridge connects the elevator and mill with the water front, over which the grain can be carried from the boat to the elevator or from the elevator to the mill, and the finished product can be carried from the mill to the water's edge.

The first portion of the elevator was designed by The MacDonald Engineering Company of Chicago, the milling machinery by Nordyke & Marmon of Indianapolis, and the mill, warehouse and addition to elevator were designed by Maurice C. Couchot.

Weeks & Day, Architects, San Francisco, have been announced as winners of the competition for the State Buildings at Sacramento.

The jury was composed of Governor William D. Stephens, Chief Justice of the State Supreme Court F. M. Angelotti, Marshall de Motte, chairman of the State Board of Control, and the following architects: Sylvian Schnaittacher, San Francisco, William M. Kendall, New York, and Henry Bacon, New York.

The competition covered two buildings, a building for State offices and a building for the State Library and Supreme Court, to be erected opposite the Capitol. The second stage of the competition was participated in by eight architects chosen in the first stage, which was judged during June of this year. Construction will probably not be undertaken until after the war.

MILL AND WAREHOUSE FOR THE SPERRY FLOUR CO., VALLEJO, CAL.

MAURICE C. COUCHOT, Consulting Engineer

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THE ARCHITECT

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Editorial.

Estimates of American architecture (by native critics) have in large part assumed a tone of increasing satisfaction, approaching at times to complacency. And, it must be confessed, when attention is confined to the eminences the achievement is impressive. The best of our governmental buildings, national, state, and municipal; the great public utilities, such as railroad stations; our more important educational and religious institutions; the most significant of our commercial structures; the homes of the more cultured and well-to-do classes — these all constitute a body of work which, albeit somewhat lacking in coherence, certainly reveals a high degree of aesthetic sensibility and accomplishment. It is questionable, however, if the vitality of a people's art can be judged by a scrutiny of its most conspicuous attainments alone. We insist upon art as an index of culture. Certainly no adequate study of a people's life could be conducted upon an acquaintance confined to figures prominent in politics, society, and art. What validity can be claimed for an evaluation of a people's art which fails to recognize its points of contact with the people and with the practical needs of every-day life? A study of monuments may provide a measure of the eclectic cultural development of a favored minority. To gauge the vitality of our architecture as a social force we must embrace as well the factory, the warehouse, the train shed, the small moving picture theatre, the apartment house, the working man's dwelling.

An examination of American architecture which includes within its scope these popular and utilitarian manifestations reveals certain fundamental deficiencies—deficiencies which are most patent in what may be called the minor work, but which, more discreetly veiled, to be sure, vitiate much work of the first importance when measured by the most comprehensive critical standards. I refer to something more serious than the deplorably insufficient aesthetic equipment of many of our designers. A bungling attempt in the right direction is of richer promise than the most accomplished achievement of a perverted aim. I allude to defects which are radical — the artificial partition of the architectural field into "practical" and "aesthetic" categories (with the attendant assumption that they are mutually incompatible); an insufficient respect for the natures of structural systems and materials; and, in consequence, an arbitrariness in the relation between effect and means. The indictment might be reduced to even lower terms by saying, a concentration on the aesthetic to the neglect of the organic unity of architecture in its entirety.

At bottom this shortcoming probably rests upon the popular fallacy which regards art as the superaddition of unessentials, with its corollary that the introduction of art is always optional, often a matter of indifference, and not infrequently undesirable. To do justice to the lay public, I have probably erred in calling these fallacies "popular." The evidence of much of our architectural design would seem to establish them in equal degree as professional fallacies. As architects we have been preaching the necessity of beauty, and its unity. We have contended for the social doctrine that beauty is an essential in the structure of a fully realized life, and for the architectural doctrine that beauty must be one with the physical structure. That the force of circumstances has all the while operated to exclude beauty from the lives of the great masses of men, and that we have gone about designing buildings by applying superfluous ornament to the front facades of unshapely structures, is probably a reproach to our insight rather than to our sincerity. But now, when we hear ourselves reminded that architecture is not the imposition of a preconceived prettiness; that, indeed, it is an asset which even in our factories and commercial establishments we can not afford to neglect, we are startled to recognize the voice of the engineer. We have been prone to bask in our aesthetic righteousness, charging the engineer with imperviousness to the claims of spirit. But when the engineer begins to steal our thunder as well as our business, it is no time for complacency.

Yet there is an all-important step which still remains to be taken beyond the point assumed by the progressive industrial engineers and managers. Upon our attitude toward this problem will depend the justification of our pretensions as exponents of an enlightened and humane culture. That attractiveness in factories and the welfare of employees have gained recognition as desiderata is no inconsiderable gain, whatever the means and motives. It is not enough, however, that these benefits be accorded as a philanthropic indulgence; not enough that their concession be prompted by the economic interests of the employer. We must strive until all the amenities of an enlightened culture are accessible to every man by virtue of his dignity, his significance, and his possibilities as a member of human society. When this shall have been attained we may possibly witness the flowering of that new architecture, at once "modern" and "American," which a sterile aesthetic criticism has been blindly demanding, and which a self-conscious aesthetic dilettantism has been making futile sporadic efforts to invent. Our architecture, like our democracy, must be a free expansion from within outward, not an imposition from above downward.

IRVING F. MORROW.